

PATHWAYS

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BUILD UP AND DON'T BREAK DOWN

by Jose Paul

Every school appoints a group of senior students as prefects, monitors and school leaders. They are usually considered by the teachers as policemen, necessary for the maintenance of proper discipline. They are supposed to correct the children when they do not wear the proper school uniform, when they make a noise in the class, when they do not move in line from assembly to class or to and from the play ground. When they carry out these and a host of other duties, they are usually the target of attack, ridicule and displeasure from other students. When they fail to perform their duties or are somewhat slack, they become the target of the teachers. They are answerable to the teachers as well as to the students; they lie between the devil and the deep sea.

A group of student leaders and prefects of Fr. Agnel School spent a day together to find a good way of managing their job efficiently. What emerged was the consensus that the prefects and leaders are not policemen, rather they are part and parcel of the school community involved in building the personality of the children. They analysed the types of situations they face along

with the several verbal and nonverbal behaviours they respond with. They found that most of the time they are looking for what is wrong. Most of their responses were of a negative nature: finding fault, scolding or reprimanding wrongdoers and handing out punishments at their own level. As a result they were building up a negative culture both for themselves and for the school. They realised that this was not their true function. They are meant to build not to destroy; to create not to kill. As an integral part of the school, they needed to establish a positive atmosphere where growth could take place at all levels.

In their attempt to develop such a climate in the school, they searched for ways and means. They soon realised that their own behaviour pattern had to change. They decided that they were consciously going to look for the "goodness" in the children along with the so-called bad behaviours. They adopted two mottos for their group: "Catch the children being good" and "Catch them doing good". They decided to show the others appreciation for what they are and what they

do: to encourage them for what they are capable of doing.

In order to achieve this goal, first and foremost, the leaders felt that they had to change their own non-verbal and verbal behaviours. After discussion, they realised that several types of non-verbal behaviour such as eye-to-eye contact with other children, a genuine smile, greetings and effective listening techniques could help them. However, they felt that the most important aspect of the change should be in the area of verbal communication. Usually they were short of an adequate vocabulary for positive interaction. So they decided to build up a set of positive growth-oriented statements. These could help them to react appropriately when they caught others being good and doing good and also, as happened very often, breaking the rules of school. The list given here has been prepared by this group of students. We found this collection of statements helpful for anyone in authority and decided to print it almost verbatim.

BOOSTER STATEMENTS

1. You have every reason in the world to be happy.
2. Wow, what a chain you're wearing! But you know the school rules... please, it is not allowed in the school.
3. We certainly expect you to be successful.
4. Well done! Keep it up!
5. You tried your best: still the answer could be improved.
6. You certainly have the finest of choices.
7. This sure looks great on you.
8. I know that you have not been successful this time but I am sure you'll do better in future.
9. Its rare to find friends like you.
10. You've been wonderful to me.
11. I am grateful to you for the favour you've done for me.
12. You would look smarter with a button on your shirt
13. How can the shirt of a person like you be without a button.
14. You will look pretty with your lovely hair undone. What a pity! The school rules insist that you tie it up.
15. Your voice is very sweet—do participate in the school competition
16. Come on! Buck up! You're sure to make it.
17. We are all with you, so best of luck!
18. Wow! You dance really well!
19. You are a born artist indeed!
20. You are worthy of your success.
21. Shouting does not go well with your cool personality.
22. Come on, don't get depressed! You are capable and will get many more chances.
23. Congrats! You have done very well in exams.
24. Don't spoil your lovely nails by keeping them painted all the time.
25. Covered note books will suit your neat personality.
26. To someone not having done well in the test: "I understand your feelings. I am sure next time you will do better "
27. Somebody performed badly in the debate, his friends cheered him up saying: "You put in your effort. There will always be next time."
28. Somebody makes a mistake and apologises and the other person says: "Doesn't matter; everyone makes a mistake. Let us not do that again."
29. Somebody is singing not so well at an informal party ... some friends said, "Thank you for your attempt to liven up the party."
30. A boy getting nervous before coming on to the stage: "Everyone gets nervous. It is natural. Come, we know you can do it."
31. I really liked it, you are so honest.
32. What a lovely handwriting!
33. I am happy to see you.
34. Thanks for visiting me.
35. How thoughtful of you
36. Your work is well done, keep it up!
37. You are a hard working guy!
38. I can't have a better friend than you.

—Continued on page 16

LET'S OVERLOAD: A CALCULATOR GAME

The game requires two players, each equipped with a calculator. In addition they need two dice.

The aim of the game, as implied by its name, is to try and overload the calculator.

The dice are rolled and the player rolling the highest number begins by pressing it into his calculator (12 is the highest). If the player rolls two equal numbers, everyone rolls the dice again and adds the new figure to the first.

Bad Luck

If you throw a double after the start, that is bad luck. You must divide the figure on the display of your calculator by the number on your dice.

Success

If you roll an uneven number, you've had success. You can multiply the new number by the one on the calculator.

Luck

If the sum of your dice is 7 or 11, you multiply that with the figure on your calculator and throw the dice again.

Now a sample match between Asha, Babu and Chitra

Round 1 : Asha : Rolls 3/4 and presses 7

Babu : Rolls 6/1 and presses 7

Chitra : Rolls 5/6, presses 11 and starts the next round

Round 2 : Asha : Rolls 4/5, Presses $7 \times 9 = 63$

Babu : Rolls 4/4: BAD LUCK; presses $7 \div 8 = 0.875$

Chitra : Rolls 1/6, has LUCK, presses $11 \times 7 = 77$, rolls the dice again : 1/2.
Now $77 \times 3 = 231$

Round 3 : A rolls 2/5; LUCK : $63 \times 7 = 77$, rolls the dice again to get 4/5, that is $441 \times 9 = 3969$

B; is now on a lucky streak. He first rolls 2/5 and then 3/4, then 1/6 and then 1/5. That is $0.857 \times 7 = 6.125$, $6.125 \times 7 = 42.875$ and $42.875 \times 7 = 300.125$ and finally $300.125 \times 6 = 1800.75$. He's caught up!

C rolls 2/6 and presses $231 \times 8 = 1848$.

Round 4 : A starts this round with 4/5, presses $3969 \times 9 = 35,721$

B is fighting: 3/4. So it is $1800.75 \times 7 = 12,605.25$. Then 3/5, which takes his total to 100,842.

C roll 2/5 and presses in $1848 \times 7 = 12,936$. Next 1/6 ... $12,936 \times 7 = 90,552$. Then she has BAD LUCK and rolls 5/5. She has to divide her number by 10 and it gets reduced to 9055.2.

The game continues this way till one of the three players overloads his/her calculator. The winner is awarded a point. Five more games are played and at the end all points are added up. The overall winner is the one with the most points.

SHANKRANTHI—A PROJECT

by Raghubabu

In January 1987, our school at Anantpur took up a project built around the festival of Shankranthi. It is a peasants' festival; a villagers' festival; a children's festival. The children have rich experiences associated with it and the teachers wished to explore these, thereby providing the students with opportunities to learn various subjects, including art and craft.

The project itself could last for a week or ten days and we wanted to ensure that whenever the children entered the school they should find an atmosphere of Shankranthi everywhere. All activities and subjects were to be related and integrated with this theme. The intention was to create an environment in which the children would be in a creative mood, creating both as individuals and in a group, at times concentrating all their energies to work together as a team. The teachers would function as helpers, helping the children by drawing out their talents, to bring out their inner feelings and their world.

After two days of discussions our plan was ready. It is given in outline below:

1. Telugu & English Classes

Reading poetry relating to Shankranthi; Symbols; Songs and actions of Gangireddulu (decorated oxen), Haridasas, Budabukkalavallu etc.; Bhogipallu; Shankranthi festival celebrations; 3rd day Kanuma festival; Rangolis; Cock fighting; Cooking porridge with new rice; Superstitions during the festival . . .

2. Science Class

Sun; Planets; Is Earth rotating around the Sun? or, Is Sun rotating around the Earth?; Zodiac; How the Sun enters into the zodiac sign of Capricorn? . . .

3. Social Studies Class

Calendar; crops; seasons . . .

4. Maths Class

Area; Shapes; Patterns; Symmetry; Division; Income and expenditure . . .

5. Craft Class

Decorate the school-yard with rangolis . . .

6. Painting Class

Mixing of colours; Drawing & Painting of Bhogi fire; Pictures of Gangireddulavallu (decorated oxen), Gobi dance; Games with cocks; Bhogi bath; Whitewashing the houses; Cooking porridge with new rice; Worshipping the cattle . . . etc.

7. During Assembly Classes

Acting like a family celebrating the festival; Monoacting of Gangireddulavallu, Budabukkalavallu, Yanadivallu etc; Dances . . .

A Conversation on Shankranthi

Birds were making a noise on the tamarind trees. Squirrels chased each other from the top of the tree to the ground, from the ground to the tree, and were enjoying themselves . . .

The children gathered under the tamarind tree and started a conversation . . .

Teacher (I): So, your sisters, brother-in-laws and your relatives who live in other villages, will come to your home for the festival—O.K. But, tell me what is a festival? What does it mean?

Children : We all gather, meet with each other . . .

I : Then?

Chi : —White wash our house

- Smear the floor and put rangolis inside and outside the house
—Worship the cattle
—Prepare sweets
—Wear new clothes
- I : O.K. I agree to all that, but, I want to know what is a festival?
- Chi : We will all be cheerful, happy and together we play games.
- I : What is cheerfulness?
- Chi : ? ? ?
- I : O.K. When you will be cheerful?
- Chi : When we enjoy ourselves, when we are happy
- I : So, if you are happy, you will be cheerful. If you are happy you can play, sing What do you think, will you be happy if you are alone? Will you be happy if you are with a group?
- Chi : We will be happy as a group.
- I : Why? Why don't you get happiness if you are alone?
- Chi : If I am alone, there will be none to converse with; no one to play with and we will be bored *Anna* (brother)
- I : If so, go and sleep when you are bored
- Chi : How much can we sleep?
- I : Then, keep free, don't do any thing.
- Chi : How can it be? If we speak with others we will be happy. Is it good for us to be alone without speaking to others?
- I : So, if you are with others, you will be happy! O.K. Not only you and your few relatives, if the entire village is with full of happiness, wearing new clothes, eating sweets then
- Chi : Then it is a festival
- I : So a festival means?
- Chi : All will be happy
- I : A festival means, not only one person or a few persons, but the whole village and the entire country should feel happy and live happily Then it becomes a festival *Mallikarjuna*, how do your family members celebrate festivals?
- Mallikarjuna* : What festival *Anna*?
- I : Any festival, for example take *Shankranthi*
- Malli* : We celebrate it for three days. The first day we wake up early in the morning, lit the *Bhoghi* fire, boil *tegas*, an eatable (roots of palmyra tree) also and thus we get warmth from the cold.
- I : How is that *Bhoghi* fire?
- Chi : —The fire touches the sky
—It was red
- I : After the *Bhoghi* fire what do you do?
- Chi : We have an oil-bath
- I : How is that oil-bath?
- Chi : We have an oil-bath with soap-nuts
- I : Why do you have an oil-bath with soap-nuts? Why can't you use other material?
- Chi : Because it will remove the oil and cleanse the hair
- I : What happens if the dust, oil remain in the hair

- Chi : We will get a head-ache
- I : What happens if you get a head-ache?
- Chi : If we get any ache, it will not be good for our health
- I : After a bath what will you do?
- Chi : After the bath, mother will give us new clothes. We wear them, meet our friends, greet them and play . . .

The conversation will go on like this

There will be no begining or end! There is no hesitation from either side. The children are eager to exchange their views and talk about what they know and whatever they celebrate at home. The only thing is that the teacher has to be patient and conduct an appropriate dialogue with the children. Otherwise, they get bored. There are no textbooks . . . no lessons . . . no teaching . . . no definitions to explain and nothing to ask the children to memorise! The experiences of the children are our textbooks. They can think. They can come to conclusions, they can invent definitions, they are happy to announce what ever definition they have found they know many things!

A one-way lecture method makes children dull and disinterested! But, this type of conversation will help and allow all children to think and respond! They can identify, discover and find unknown things—but still children make noise, quarrel, and get up to mischief, all under the tamarind tree—because, it is an open place, not a class room!! They had lots of materials around them like sticks, stones and soil to tease other children. Sometimes they chase the squirrels, drive away the birds, watch the surroundings for an interesting thing. In the classroom, within the walls, they cannot get such materials.

Shankranthi Came Once Again, Weeping

"Very good! You said many things about Shankranthi. I learned a lot from you. Now

it is time for creation. Before we write something I would like to read a few poems" I said.

Immediately Narayana loudly started to sing a poem from a drama. I stopped him with a smile and read a few poems from the epics. The children did not like them! Then I asked the children, "Never mind, if you do not like them. Can you write poems like this?"

Everybody went into a pensive mood. Vijaya, Ravi, Malli, Mallikarjuna sat quietly with closed eyes for sometime—then began to weave their ideas into words:

Jungli brought his poem:

"It has come! It has come!
Shankranthi festival has come!
It came to spend money
Money it spent on
The rice
For preparing sweets . . .
No paise is left in their hands!
But, again they enjoyed chicken curry!"

—Jungli

Jungli sees every thing from a point of economics, he reflects poverty and his difficulties

Kristayya always thinks in negative way:

"Green Shankranthi came by weeping
When we are preparing sweets it came by weeping
Shankranthi ate all of our sweets
Along with this weeping green Shankranthi
The fog also came!
Then we lit Bhogi fire
Because the weeping Shankranthi brought the fog"

—Kristayya

Narayana wrote a small conversation:

I : Wake up brother-in-law!
Mother asked you to wake up
and light the Bhogi fire.

Brother-in-law : Wait! The sun has not risen .

—Continued on page 15

THINKING SCIENTIFICALLY

Over the years, the number of people, organisations and agencies involved in Science & Technology (S&T) popularisation has grown phenomenally in our country. So have various activities and use of different media. All India Radio broadcasts at least one programme everyday on a scientific topic from all its stations, in addition to the ones on health and agriculture. Several AIR stations with science cells broadcast three programmes per day. Doordarshan telecasts about two programmes every week on the national network and all regional centres put together produce and telecast some 100 S&T programmes every year. UGC, CIET, IGNOU also have regular slots on Doordarshan. NCSTC has been encouraging publications of popular science books/magazines in regional languages, besides trying to utilise various media and means and networking of different peoples' science groups. Bharat Jan Gyan Vigyan Jatha—1992 touched nearly 400 districts and about a fourth of our country's population. One of the common objective of all S&T popularisation efforts has been the inculcation of scientific temper. And yet often we ask—where is that elusive scientific temper?

It does seem a bit paradoxical though, but, even after putting in the best of our efforts to inculcate a scientific attitude among the masses for a number of years, we find ourselves where we began, like Alice and the Red Queen remaining under the same tree, however fast they ran for whatever time. In a recent meeting to take stock of the present scenario and work out an integrated action plan on S&T popularisation and inculcation of scientific temper, one of the speakers, Prof. Yash Pal, put in this way, "A good deal of S&T popularisation work is going on at present, but, a headway is yet to be made. It is tragic that often educated and scientific people lack scientific temper!" This then succinctly sums up why our efforts directed towards inculcation of scientific temper, development and harmony meet with only a very limited success.

It is amazing how the spirit of enquiry is turned on in a scientific laboratory and turned off when faced with matters of other human activities! Why is it that we rarely talk about the spirit of enquiry or scientific attitude when we deal with matters related to religion, language, society, sports, administration and so on?

Scientific attitude does not imply imparting or acquiring information alone. It also implies organising, analysing and applying the same in order to arrive at a solution or creating meaningful patterns leading to a systematic understanding of the environment we live in—physical or social. For the development and growth of a society, the spirit of enquiry and scientific attitude needs to be inculcated at every level in every system, whether at home, office or street—from the lowest to the highest functionary, from a peon to the top bureaucrat, from a child to parents and teachers. Where do we begin?

Science being a process and method rather than a mere branch of knowledge, it naturally permeates every human activity.

However, the scientific method reaches a dead end when faced with retro- forces of vested interests. Whether it is a day-to-day affair, social or a religious issue, environmental problem, reforms for improvement of an existing system, policy formulation; no progress could ever be expected without being scientific in our approach and scrupulously guarding against and resisting the forces of backwardness like irrationalism, fatalism and of course vested interests. Many of us—scientists, science communicators, social workers, students, teachers, administrators etc,—have been actively engaged in a variety of societal problems in a bid to transform our country into a nation of a literate and scientifically minded people. Let us realise that there is more to learn than teach in the

—Continued on page 15

HOMEWORK

—Something To Think About

Homework is such an integral part of our teaching routine that we often do not stop to think about it. A lesson is finished..... "Children, please do all the exercises at the end of the chapter and submit your notebooks tomorrow".

Have we analysed whether these questions are the most useful ones? the best way of recapitulating the lesson? the best feedback on the effectiveness of our teaching?

Why give homework? Think about that first. Maybe you could add something to the points given below. Homework is useful for

- revision of classroom learning (facts)
- practice of skills learnt in a school (including spelling drills, multiplication, geometrical constructions etc.)
- preparing for the next lesson
- developing in students the ability to work independently, without direct/indirect supervision
- learning something "extra"—additional information, new skills
- learning how to use local resources obtained outside school
- developing creativity in students
- promoting self-confidence, cooperation and many other social skills in students
- providing the teacher with feedback on the effectiveness of his/her teaching strategies.

Homework usually takes the form of

- reading—followed by oral/written feedback
- written exercises
- activities of many kinds—most of which involve finding out

The teacher must consider his/her own objectives clearly.

- How much has actually to be memorised? Certainly, definitions and statements of laws, which help students gain valuable marks in tests, are to be learnt by heart. Likewise multiplication tables learnt well lead to speed in computation. But mere learning by rote hinders self-expression and stifles creativity.
- How can an element of novelty be put into the assignment? Can we reduce the drudgery and boredom of the students? Can they have fun and still learn?

How are some ideas—general ones which you might like to try out in your own subject.

A. Vocabulary Development

- (i) Find spelling errors in a given list of words.
- (ii) Practice using the dictionary to find the meanings of given words.
- (iii) Use a Thesaurus to find synonyms.
- (iv) Use a 'Word Power' type quiz (refer to any issue of the Reader's Digest, if you need a sample)—to check on understanding of new words.
Can students make up such quizzes for each other?
- (v) Crosswords can be used successfully to test knowledge and understanding of technical words/definitions and simple facts.
Try giving the completed crossword and get children to make up clues.

- (vi) Locate words hidden in a 'word square'. Even young children enjoy making up these squares.
- (vii) Try word building and word chain games.
- (viii) Find rhyming words.
- (ix) Get children to write limericks/poetry.
- (x) Let children look for a pattern in words—eg; the names of chemical compounds follow certain simple rules which indicate their structure; parts of the human body have certain adjectives associated with them—eg cardiac (heart), pulmonary (lungs) and so on.

B. Checking Facts

- (i) Use crosswords—mentioned above.
- (ii) Get children to write out 'howlers' for their friends to find the mistakes.
- (iii) Children can set 'tests' for each other. This involves careful learning and checking up on facts before hand.
- (iv) Multiple choice questions are usually difficult to set but worth the trouble. Children enjoy them and correction is simple. Use them to test application also. Build up your own question bank to use as the need arises.
- (v) Use a Time Line to check on facts/events which occur in a sequence.

C. Using Local Resources

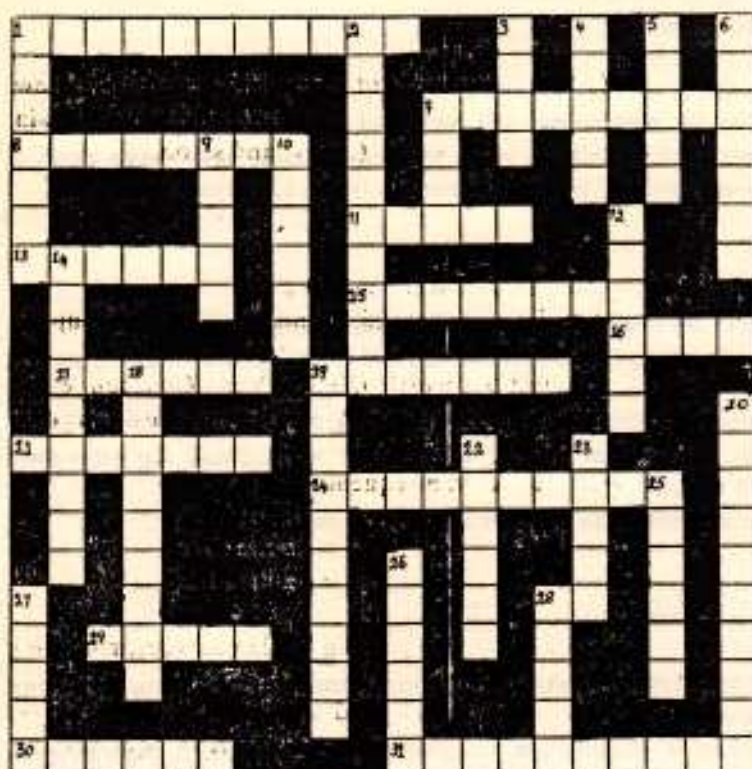
- (i) People—find out about their lives (history!)
—their opinions
Teaches the children the art (or skill) of asking questions, conducting surveys, recording results in tabular form, drawing conclusions.
- (ii) Gardens—develop skills like careful observation (of plant and animal life), recording (in words/pictures), map reading (a skill which we cannot take for granted), questioning, setting up simple experiments (temperature, rainfall, growth of plants, animal habits etc), applying theoretical knowledge.
- (iii) Buildings can be used to develop concepts in science and mathematics; historical buildings can make the past come alive.
- (iv) Newspapers an excellent source of data:
—weather reports, prices, advertisements
—"quotable quotes" and "blunders"
—interesting descriptions, narratives, interviews.
- (v) Scrap Material can be used,
—for art and craft work.
—to make working models in science and social studies. Much learning goes into the process of trying, failing and trying again!
—for "dressing up",—pretending you lived long ago—for your costume and props for the story/scene to be enacted. Young children would enjoy this thoroughly.

Activities of this kind can sometimes be given to groups, thereby providing them with opportunities of working together and learning valuable lessons in cooperation.

Activities done outside school hours do not suffer from any constraints of time, leaving children free to explore many new avenues. Some of the skills learnt are those which we have no time to impart during working hours—which are, however, essential to life in the modern world.

(Reprinted from *PATHWAYS*, August 1985 issue)

GREAT MEN OF SCIENCE



CLUES

Across

1. Indian agricultural scientist associated with development of new rice strains
7. His accidental encounter with radioactivity was the first recorded.
8. He found, he could "see" the bones in his hand.
11. He measures radio waves even today.
13. He measures electric current.
15. Discoverer of the electron
16. His device saved the life of many hundreds of coal miners.
17. An intrepid voyager who looked for the missing evolutionary link.
19. His lectures to the Royal Society included a whole series on a candle!
21. The discoverer of a useful mould.
24. He found the nucleus of the atom.
29. An eminent Indian known for his effect.
30. His scale of temperature stretches down to the lowest possible limit.
31. He solved the mystery of the king's golden crown.

CLUES

Down

1. Father of Indian surgery who developed unique surgical instruments
2. Indian astronomer after whom our first satellite was named.
3. Discoverer of the tubercle bacillus.
4. His name replaced the calorie.
5. She worked for months to reduce tons of pitchblende to a tiny amount of a new radioactive element.
6. He was forced by his persecutors to "abandon false opinion which maintains that the Sun is the center and immovable ...". The year was 1534.
7. He saw the solar system within the atom
9. A Greek physician of ancient times who made extensive studies in anatomy and physiology.
10. His experiments ranged from the heavenly bodies to colour and light. He said: "If I have seen further it is by standing on the shoulders of giants."
12. An Austrian monk who loved gardening.
14. He was among the earliest to seek order in the arrangement of elements.
18. Famous Indian mathematician, discovered in Cambridge—his works are still being studied. He died young
20. The first astronomer to propose the heliocentric theory of the universe.
22. Planets moved according to the laws he stated.
23. His 'pile' gave the curious a shock
25. A school headmaster at the age of twelve, this Englishman was an early proponent of the atomic theory.
26. The father of Indian nuclear science.
27. A 1962 Nobel Prize winner, along with two others, for establishing the structure of DNA.
28. An Italian-American whose work led to the first nuclear chain reaction and the atom bomb; he won a Nobel Prize in 1938.

(Answers on page 15)

DO YOU KNOW ABOUT....

I. Trees and Forests Soil and Forests Water and Forests Agriculture and Forests Tribals and Forests

An Environmental Education Series produced by The Indian Environmental Society, U-112, 3rd Floor, Vidhata House, Vikas Marg, Delhi-110 092. Price not mentioned.

Each of the above sets consists of a packet containing twelve charts, about 25 cm square, highlighting the importance of trees.

The first set, which has been available for many years, tells about the role of trees in nature, the different kinds of Indian forests, their location and importance. The text is informative yet brief. The drawings, though in single colour, are excellent.

The illustrations in the remaining sets are almost equally good, though the tribals drawn in the last one could be improved upon. In some cases, as for example Soil Erosion, 'before' and 'after' pictures would have been clearer. However the text in many cases is too pithy: a little more explanation would help towards understanding of the concepts.

Apart from display on classroom bulletin boards, these charts would serve as starting points for teacher-guided discussions on the great value of trees in our environment.

II. With more and more schools in Delhi (and other parts of our country) getting involved in environment-related activities, The Little Green Book brought out by Kalpavriksh should serve as a useful index and guide to "environmental opportunities activities facilities and resources". It is written, no doubt, with special reference to Delhi but does provide a directory of Environ-

mental Academic Programmes in India. Copies should be available from KALPAVRIKSH, C-17/A, Munirka, New Delhi-110 067.

III. Art Education is now seen as an important part of the development of human minds. Arya Book Depot's new series of three books titled **A New Approach to Art Education** draws attention to a variety of drawing and painting techniques, clay modelling and pottery, puppetry and mask making. Each subject is dealt with rather briefly, and for interested teachers these books will form a starting point for further explorations.

IV. **Mental Quest in Mathematics** is a set of three books for Classes VI, VII and VIII, also brought out by Arya Book Depot (30 Naiwala, Karol Bagh, New Delhi 110 005). The authors, senior teachers of a Calcutta School, express in the Preface, the need for students "to feel relaxed and delighted" while working on the exercises in this book. They hope that the series will be instructive while mixing a lot of fun.

V. Of interest to senior science teachers are:

(i) **The Ozone Hole** by Prof. M. Chandra, a booklet brought out by the Department of Education in Science and Mathematics, NCERT, as part of a project on Development of Materials in Chemistry on Some Current Topics of Human Concern. An area of concern to scientists and environmentalists the world over, the depletion of ozone in the earth's atmosphere is something which even young students are aware of. To explain this to them properly, teachers need to be themselves well informed. Apart from this, senior secondary classes will find the chemical explanations useful.

(ii) **Copies of Solid State Chemistry—A Structural Consideration**, a talk delivered by Professor R.D. Shukla at the Springdales

School Teachers' Centre can be obtained from Mrs. Geeta Mathur, Director of the Centre.

Perhaps teachers, who did not attend this lecture, could contact: Mr. A. Dasgupta, Head of the Chemistry Department of Springdales School, Pusa Road, New Delhi 110 060, for details of the simple models made of table-tennis balls and thermacole beads, which Prof. Shukla used to illustrate his talk.

VI. KARE is an organisation dedicated to Kindness to Animals and Respect for Environment. Many children are unknowingly cruel to animals. Kicking of a stray puppy, teasing

animals at the zoo and elsewhere are acts we often see. KARE is trying to sensitise both young people and adults to issues such as animal abuse, cruel methods of training animals for entertainment, "experiments" on animals, crude and cruel methods adopted for raising livestock and for their slaughter etc. Their leaflet points out that Animal welfare laws exist but are not being enforced or implemented.

If you would like to know more about their activities, write to them at M-39 Main Market, Greater Kailash-I, New Delhi-110 048. Contact telephones: 252 0333, 641 2963, 66 2253, 643 2477

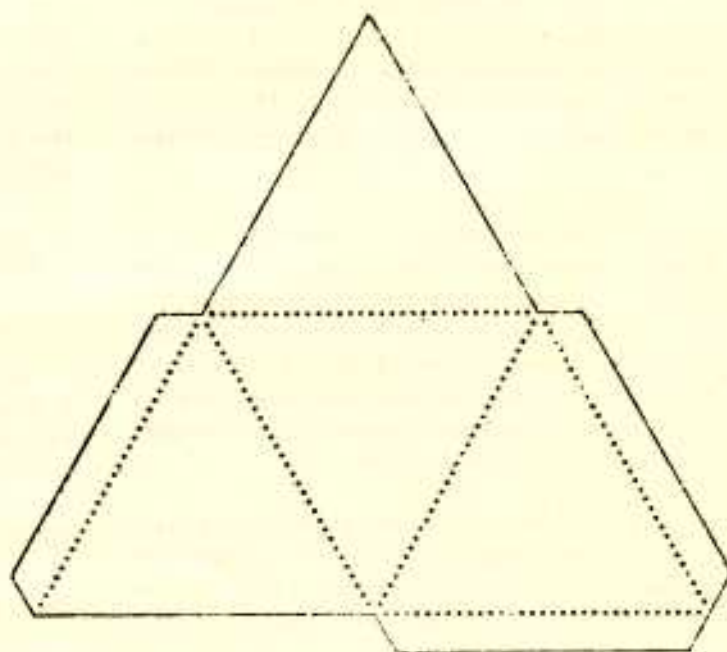
PYRAMIDS AND OTHER SOLID SHAPES

What is this? It looks like a design made out of triangles. Well, it is—but it's also something that you can make into something else!

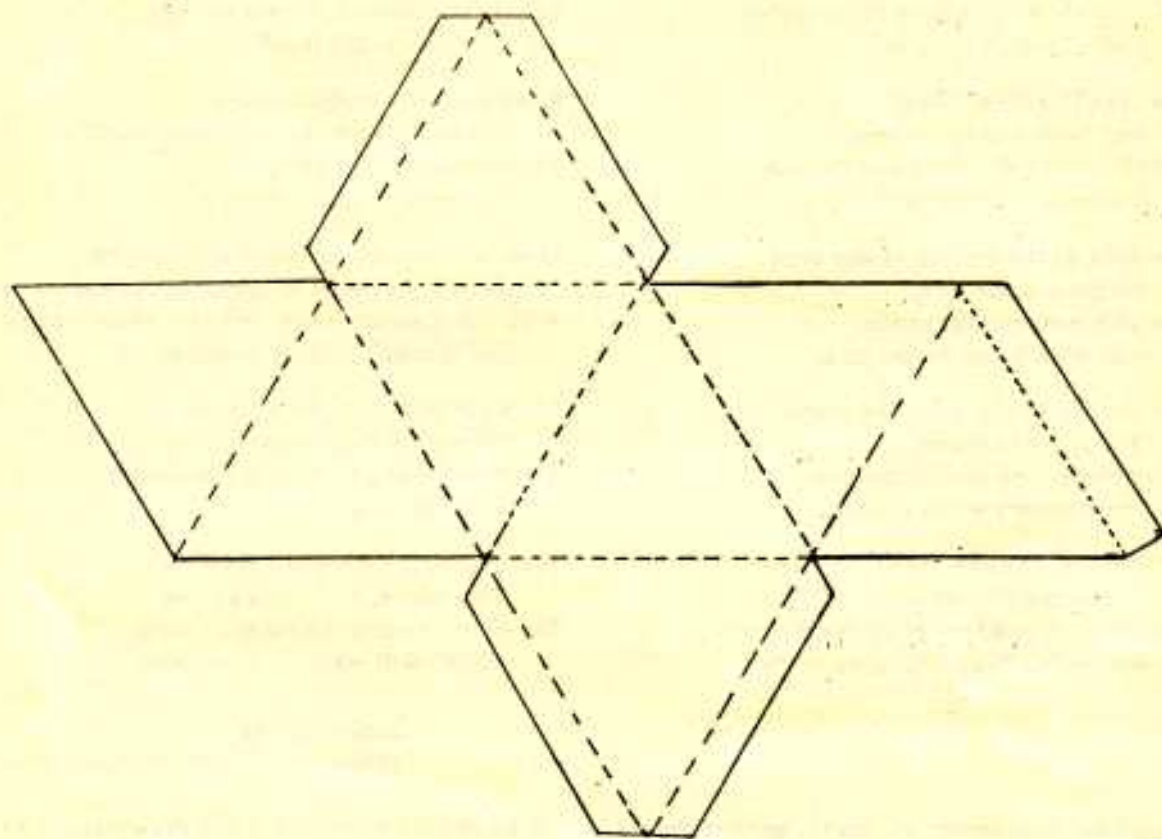
Trace the design on a piece of paper and then cut it out. If you want to make a much stronger construction, you can glue your tracing on to card or thicker paper before you cut it out. Fold the paper on the dotted lines. Use your thumb nail to crease the folds sharply. Then open the paper and fold the flaps (1).

Working with one flap at a time put a bit of glue on each flap, then stick the flap to the underside of the triangle next to it. You'll easily be able to tell where the flaps go. When you've done all this, you'll find that you have made a sort of pyramid. A shape of this kind, with four triangular sides that are exactly the same is, called a tetrahedron (teht ruh HEE druhn).

A tetrahedron is what is called a solid shape. It is a shape that has three dimensions—length, width and thickness. A flat shape such as a triangle, has only length and width. The piece of paper you used is a flat shape. And the four triangles on the paper are also flat shapes. Yet, you made a solid shape. And the fact is, a great many solid shapes can be made out of flat shapes.



Here is another solid shape made out of triangles. Trace this pattern; fold and glue the flaps to make your own octahedron. Find out what the prefixes "tetra" and "octa" mean.



Now look at examples of cubes and cuboids. What is the shape of each face? Are they all the same shape? the same size? How do you think the solid figure will look if it is opened out flat like the above two shapes? Help children draw these shapes. If they are old enough, they can be drawn accurately with ruler and pencil, cut out and assembled into solid shapes.

What other common solid shapes can they see? (A cone and a cylinder), what objects have these shapes? How does the cone differ from a tetrahedron? How can a cylinder be made up out of flat circular discs.

For the children in the upper primary and middle school, this lesson in geometry can lead to enjoyable hours of experimenting with shapes apart from practising the skills of careful precise drawing, cutting, folding and pasting. Why not combine this with art? Decorate the solid shapes made. Combine different textures and colours to make mobiles and designs.

THE ROADS OF MATH

Take a line, a straight line,
And divide it into three.
Make the three lines form three angles,
And a triangle have we.

Now take this little triangle
And twirl it about in space.
Twirl the triangle 'round and 'round;
A cone is what we face.

Now look at the bottom of our cone.
We see a circle true.
Now let's examine the circle
And what it can do for you.

Let's draw a line through the center
Of our circle round.
We've discovered something new:
The diameter we've found.

Let's look at the line round the circle.
The circumference says, "Hi!"
Divide the circumference by the diameter,
And we've found the number Pi.*

Now take our semicircle
And take a point on the rim.
Using the diameter, form a triangle.
(It doesn't take much vim.)

Look carefully at this triangle.
If you do, something different you'll see.
For the largest of its angles
Has exactly ninety degrees.

Now take two of these new right angles.
Put their vertices in the circle's center, there.
With the diameter under one side of each angle,
We're ready to form a square.

Mark the points on the circumference
Where the right angles do fall
Construct triangles in both semicircles,
And that is all.

From a line, to a triangle, to a cone,
To a circle, to Pi, to a square.
We have traveled the roads of math,
Which will take you anywhere!

Jeffrey Dielle

(Reproduced from the Childcraft Series)

A poetical expression of many geometrical facts. Why not ask your students to draw imaginative illustrations for each of these verses? Remind them to use stick figures and other decorations, not just the plain geometrical drawings.

(*Pi is a Great letter that looks like this π . In mathematics, Pi is a symbol for a number close to 3.14. To find the circumference of a circle, multiply the diameter by 3.14. And, as the poem says, if you divide the circumference by the diameter, you get the number 3.14.)

A tablet from ancient Assyria, about 2800 BC, has been found that states: Our earth is degenerate in these latter days. These are signs that the world is speedily coming to an end. Bribery and corruption are common. More than 2000 years later, Socrates complained, "Children are now tyrants..... They no longer rise when elders enter the room. They contradict their parents, chatter before company, gobble up dainties at the table, cross their legs and tyrannise over their teachers." And Plato wrote of his students: "What is happening to our young people? They disrespect their elders, they disobey their parents. They ignore the law. They riot in the streets inflamed with wild notions. Their morals are decaying. What is to become of them?"

GREAT MEN OF SCIENCE

ANSWERS

Across

1. Swaminathan 7. Becquerel 8. Roentgen 11. Hertz 13. Ampere 15. Thompson 16. Davy 17. Darwin 19. Faraday 21. Fleming 24. Rutherford 29. Raman 30. Kelvin 31. Archimedes

Down

1. Susruta 2. Aryabhatta 3. Koch 4. Joule 5. Curie (Marie) 6. Galileo 7. Bohr 9. Galen 10. Newton 12. Mendel 14. Mendeleef 18. Ramanujam 20. Copernicus 22. Kepler 23. Volta 25. Dalton 26. Bhabha 27. Crick 28. Fermi

—Continued from page 6

I : Wake up! Otherwise mother will beat you.

Brother-in-law : Wait

(Brother-in-law again slipped into sleep and did not wake up)

I : Mother! Brother-in-law didn't wake up. Bring some water ..

Mother : Water! Why?

I : Bring it, I will tell you later.

Mother brought the water. I sprayed water on the face of brother-in-law. He stirred

Sister laughed aloud! Brother-in-law ran behind the wall and hid himself.

Many issues are there in life. Everybody has their own background. Based on this, they will respond. The school is a place to afford such opportunities to respond! Who will teach language? Who will teach literature? Children also are knowledgeable persons. They know every thing! If the school gives proper opportunities to respond, ~~then they will become great scientists etc~~ certainly

Are we creating any such opportunities for our children?

—To be continued

—Continued from page 7

task we have taken up and that we shall need to get ourselves transformed during this process of transformation in order that we attain our cherished goals.

Finally, let us not forget the enormous impact the media have in influencing the public opinion. Whatever the topic and whatever the medium of communication, scientific approach must form an integral part of our thoughts and

actions. Whether a lecture or a demonstration, an article or a news-item, a drama or a puppet show, a programme on radio or television—whatever the topic, scientific or social—scientific temper must reflect at every stage and every level. May be, we can then expect our country to transform faster into a nation of scientifically thinking people.

—V. B. Kamble

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—Continued from page 2

39. Your notebooks are well maintained.
40. Your nature reminds me of Mother Teresa.
41. I had a lovely time talking to you.
42. It's the result of your hard work.
43. We appreciate your keeping quiet.
44. Your fingers look better without nail polish.
45. Your hair band is pretty good, but it would be prettier if it were of the school colour.
46. I know you are responsible; I only remind you to switch off the fans, every time you go out.
47. Let us maintain silence because others are studying.
48. Let us go in line as it shows discipline.
49. At the age of 12 you make such beautiful drawings which I can't think of making even now.
50. You look very clean and tidy except for your buttons.
51. You would look much more charming and pleasant with your shirt buttons on.
52. I am glad you learnt to correct your mistakes.
53. I find you a very reliable person.
54. You really deserved the award for your brilliant performance.
55. You are quite punctual. Keep it up!
56. You are too good to be forgotten.
57. You are the only one who stood apart from the rest in the competition.
58. You tackled your difficulties in a most commendable manner.
59. I really praise your ability to get along well with everyone.
60. You are the best leader we ever had.
61. How nice of you to attend to the student in distress.
62. How kind of you to respect the feelings of other people.
63. I love the way you talk to the rest of the students.
64. I wish I were as confident as you are.
65. You led us right to the top.
66. You always look forward to helping others.
67. Your contribution to the school magazine is extremely good.
68. You look good with that smile on your face.
69. Such a nice meal! You are an excellent cook.
70. Your voice sounds beautiful because you speak softly and gently.
71. God has granted you a kind heart.
72. You are the life of the group.
73. Excellent! You have written so many booster statements.
74. In case you get lost, your identity card will help you a great deal, so it's better you keep it with you always.
75. Your uniform is very neat. You would look perfect if you cut your nails.
76. In a classroom a student tries to overpower or tackle another; the reaction of the class monitor towards the person: "How would you feel if you were in the same situation?"
77. You are looking really smart in this new outfit.
78. All the arrangements made by you for the party were very nice. All of us had a great time.
79. It was great to see you performing on the stage. We would all love to see you on the stage again.
80. You have a very sweet voice. Why don't you join the school choir? You will do wonders for the choir.
81. My friend, you are looking smart. You would look smarter with a clean and pressed uniform.
82. Clean nails would surely make you the tidiest person in the school.
83. You look very tidy with your shoes polished and clean.
84. Your well-ironed uniform makes you look smart.
85. Watch your step, your laces are undone.
86. While playing you can lose your ID card; so, please wear it on a chain.

If these inspire you, why not try to conduct this kind of workshop for your students too. Collect their positive statements and send them to us. When there is a sufficient number of them dealing with all possible situations we might be able to publish it as a booklet for building a better, positive and growth-oriented climate in our schools.